

WHAT IS CLAIMED IS:

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1. A method for fabricating a capacitor of a semiconductor device comprising:
depositing a conductive layer on a substrate;
forming a photoresist pattern on the conductive layer;
etching the conductive layer using the photoresist pattern as a mask to form a lower electrode;
removing the photoresist using an etching gas that is non-reactive with respect to the lower electrode; and
forming a dielectric film and an upper electrode on a surface of the lower electrode.
2. The method of claim 1, wherein the upper and lower electrodes are one of Ru, RuO₂, and a metal material alloyed with Ru.
3. The method of claim 1, wherein the etching gas is one of H₂O, NH₃, and N₂, a mixture of H₂ and O₂ in which an amount of H₂ is smaller than an amount of O₂, a mixture of H₂O, NH₃, and N₂, a mixture of N₂ and NH₃, a mixture of NH₃ and H₂O, and a mixture of N₂ and H₂O.
4. A method for fabricating a capacitor of a semiconductor device comprising:
forming a conductive region on a semiconductor substrate;
forming an interleaving insulating film having a contact hole therein over the conductive region;
forming a contact plug within the contact hole;

forming insulating film patterns on of the interleaving insulating film to expose the contact plug and the interleaving insulating film adjacent to the contact plug;

depositing a barrier film and a first conductive layer on the contact plug and the insulating film patterns;

forming a photoresist over the contact plug between the insulating film patterns;
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Weld sequentially removing the first conductive layer and the barrier film on the insulating film patterns using the photoresist as a mask, thereby forming a lower electrode and a barrier film in a U-shape in cross-section;

removing the photoresist using an etching gas that is non-reactive with respect to the lower electrode;

removing the insulating film patterns; and
sequentially forming a dielectric film and an upper electrode on the lower electrode and the barrier film.

5. The method of claim 4, wherein the lower electrode is one of Ru, RuO₂, and a metal material alloyed with Ru.

6. The method of claim 4, wherein the etching gas is one of H₂O, NH₃, and N₂, a mixture of H₂ and O₂, in which an amount of H₂ is smaller than an amount of O₂, a mixture of H₂O, NH₃, and N₂, a mixture of N₂ and NH₃, a mixture of NH₃ and H₂O, or a mixture of N₂ and H₂O is used as the etching gas.

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7. The method of claim 4, wherein the insulating film pattern comprises an oxide film.

8. The method of claim 4, wherein the insulating film pattern is formed by stacking two insulating films.

9. The method of claim 8, wherein the two insulating films are a nitride film and an oxide film.

10. The method of claim 4, wherein the barrier film is only formed on the contact plug within the contact hole.

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